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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/735,840

12/13/2000

Takeo Nozaki

P/1912-20

5830

7590

06/08/2004

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EXAMINER

HESELTIME, RYAN J

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 06/08/2004

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/735,840

Applicant(s)

NOZAKI, TAKEO

Examiner

Ryan J Hesselline

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 1,5 and 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-4,6-8 and 10-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6,7,9</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group II (claims 2-4, 6-8, and 10-12) in Paper No. 12 is acknowledged.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

3. The abstract of the disclosure is objected to because lines 2-10 describe the first embodiment of the invention corresponding to claims 1, 5, and 9, which correspond to Group I and have been withdrawn from consideration pursuant to applicant's election of Group II without traverse. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-4, 6-8, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nozaki et al. (EP 899,559, cited on applicant's IDS, see also USPN 6,040,911, newly cited), hereafter Nozaki, in view of Vacca et al. (USPN 6,076,465, newly cited), hereafter Vacca.
6. Regarding claims 2, 6, and 10, Nozaki discloses a pattern inspection method, device, and computer readable medium storing a pattern inspection program which, by controlling the

computer, scans (4) the inspected pattern formed on a substrate according to the design data with the laser beam and receives the light passed through said substrate with the light receiving device (5) and, from the pattern information obtained by said light receiving device, generates the image of the inspected pattern (15) and, for coincidence between this image and the reference data (12) obtained by imaging of said design data, corrects said reference data to generate the reference image (13) and compares the image of said inspected pattern and the reference image to detect any defects of the inspected pattern (page 3, line 35-44) wherein said reference image generation comprising provision to each pixel of sub-pixels dividing the pixel to form a matrix and calculation of the gray level of the pixel based on the number of sub-pixels belonging to the pattern developed in each pixel (Figures 2-4; page 3, line 50-page 4, line 14) and calculation of the pattern width for said inspected pattern and for the reference data at the position at the corresponding position (page 4, line 19-39).

7. Nozaki discloses that the gradation value of each pixel is calculated by the number of sub-pixels set in each pixel (Figure 3; page 3, line 55-page 4, line 7), but does not explicitly disclose that the width of the pattern developed in the pixel is obtained by dividing said gray level by the gray level step count. Vacca discloses a system and method for determining reticle defect printability including calculating the proximity of a defect in a reticle to an edge in the pattern to sub-pixel accuracy using linear sub-pixel interpolation based on pixel gray level (column 7, line 35-column 8, line 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to calculate the width of a pattern in a pixel using the gray level as taught by Vacca in order to determine a defect's proximity to an edge in the reticle

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pattern to determine the effect the defect will have when the pattern is printed onto the substrate (column 1, line 36-54).

8. Regarding claims 3, 7, and 11, Nozaki discloses that the gray level of each pixel is calculated from the number of sub-pixels belonging to said inspected pattern (Figures 2-4; page 3, line 50-page 4, line 14) and, Vacca discloses treating the count obtained by dividing this gray level by the gray level step count as the pattern width (distance to the pattern edge) of the inspected pattern developed in the pixel, the pattern width of said inspected pattern is calculated and the gray level of each pixel is calculated from the number of sub-pixels belonging to said reference data pattern and, treating the count obtained by dividing this gray level by the gray level step count as the pattern width of the reference data developed in the pixel, the pattern width of said reference data is calculated (see above discussion of claims 2, 6, and 10).

9. Regarding claims 4, 8, and 12, Nozaki discloses that the pattern correction width of said reference data is calculated from the difference between the pattern width of said inspected pattern and the pattern width of the reference data (page 4, line 19-39).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- USPN 4,559,603 to Yoshikawa discloses an apparatus for inspecting a circuit pattern drawn on a photomask corresponding to EP 105,661 cited on applicant's IDS.
- USPN 4,846,577 to Grindon discloses optical means for making measurements of surface contours including sub-pixel interpolation.

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- USPN 4,962,541 to Doi et al. discloses a pattern test apparatus wherein a pattern form must be changed to make the line width thicker or thinner.
- USPN 5,016,191 to Radochonski discloses a half-toning pixel processor including length data indicating a number of pixels of halftone cell array spanned by a line.
- USPN 6,040,911 to Nozaki et al. discloses a reference image forming method and pattern inspection apparatus corresponding to EP 899,559 cited on applicant's IDS.
- USPN 6,356,300 to Shiba discloses an automatic visual inspection apparatus, method, and program corresponding to EP 930,499 cited on applicant's IDS.
- USPN 6,504,947 to Nozaki et al. discloses a method and apparatus for multi-level rounding and pattern inspection corresponding to EP 952,548 cited on applicant's IDS.
- IEEE article to Li et al. discloses "Subpixel edge detection and estimation with a microprocessor-controlled line scan camera."

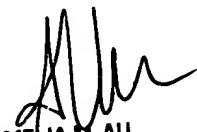
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan J Hesseltine whose telephone number is 703-306-4069. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ryan J. Hesseltine
May 27, 2004



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